AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF CLAIMS

1. (Original): A method of operating a computer system, said method comprising:

providing a program in memory, the program including at least one program unit, each program unit comprising an Application Programming Interface (API) definition file and an implementation, each API definition file defining items in its associated program unit that are made accessible to one or more other program units, each implementation including executable code corresponding to said API definition file, said executable code including type specific instructions and data; and

performing a first verification including verifying said program prior to an installation of said program, said first verification including

indicating a verification error when a first program unit implementation is not internally consistent;

indicating a verification error when said first program unit implementation is inconsistent with a first program unit API definition file associated with said first program unit implementation; and

generating a program fault signal when a verification error is indicated.

28. (New) A method of operating a computer system, said method comprising:

providing a program in memory, the program comprising at least one program unit, each program unit comprising an Application Programming Interface (API) definition file

and an implementation, each API definition file defining items in its associated program unit that are made accessible to one or more other program units, each implementation comprising executable code corresponding to said API definition file said executable code comprising type specific instructions and data; and

performing a first verification prior to an installation of said program, comprising:

indicating a verification error when a first program unit implementation is not internally consistent; and

indicating a verification error when said first program unit implementation is inconsistent with a first program unit API definition file associated with said first program unit implementation.

29. (New) The method of claim 28, further comprising:

enabling execution of said program after said first verification if no verification error is indicated; and

preventing the execution of said program after said first verification if a verification error is indicated.

30. (New) The method of claim 29, further comprising performing a second verification comprising verifying a second program unit that references said first program unit and makes no items available for one or more other program units, said second verification comprising:

indicating a verification error when the second program unit implementation is not internally consistent; and

indicating a verification error when said second program unit implementation is inconsistent with said first program unit API definition file.

31. (New) The method of claim 30 wherein:

said first program unit comprises at least one additional implementation; and

said second verification comprises determining whether said at least one additional implementation is consistent with said first program unit API definition file.

32. (New) The method of claim 29, further comprising performing a second verification comprising verifying a second program unit that references said first program unit, said second verification comprising:

indicating a verification error when the second program unit implementation is not internally consistent;

indicating a verification error when said second program unit implementation is inconsistent with the second program unit API definition file; and

indicating a verification error when said second program unit implementation is inconsistent with said first program unit API definition file.

33. (New) A method of operating a computer system, said method comprising:

providing a program in memory, the program comprising at least one program unit, each program unit comprising an Application Programming Interface (API) definition file and an implementation, each API definition file defining items in its associated program unit that are made accessible to one or more other program units, each implementation

comprising executable code corresponding to said API definition file, said executable code comprising type specific instructions and data; and

performing a first verification prior to execution of said program, comprising:

indicating a verification error when a program unit implementation is not internally consistent;

indicating a verification error when a program unit implementation is inconsistent with its API definition file; and

indicating a verification error when a program unit implementation is inconsistent with the API definition file of a program unit referenced by said program unit.

34. (New) The method of claim 33, further comprising performing a second verification comprising verifying said program after at least one program unit has been verified at least once, said second verification comprising:

indicating a verification error when a program unit implementation is not internally consistent;

indicating a verification error when a program unit implementation is inconsistent with its API definition file; and

indicating a verification error when a program unit implementation is inconsistent with the API definition file of each program unit referenced by said program unit.

35. (New) A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for program verification, said method comprising:

providing a program in memory, the program comprising at least one program unit, each program unit comprising an Application Programming Interface (API) definition file and an implementation, each API definition file defining items in its associated program unit that are made accessible to one or more other program units, each implementation comprising executable code corresponding to said API definition file, said executable code comprising type specific instructions and data; and

performing a first verification prior to an installation of said program, comprising:

indicating a verification error when a first program unit implementation is not internally consistent;

indicating a verification error when said first program unit implementation is inconsistent with a first program unit API definition file associated with said first program unit implementation.

36. (New) The program storage device of claim 35, said method further comprising:

enabling execution of said program after said first verification if no verification error is indicated; and

preventing the execution of said program after said first verification if a verification error is indicated.

37. (New) The program storage device of claim 36, said method further comprising performing a second verification comprising verifying a second program unit that references said first program unit and makes no items available for one or more other program units, said second verification comprising:

indicating a verification error when the second program unit implementation is not internally consistent; and

indicating a verification error when said second program unit implementation is inconsistent with said first program unit API definition file.

38. (New) The program storage device of claim 37 wherein:

said first program unit comprises at least one additional implementation; and

said second verification comprises determining whether said at least one additional implementation is consistent with said first program unit API definition file.

39. (New) The program storage device of claim 36, said method further comprising performing a second verification comprising verifying a second program unit that references said first program unit, said second verification comprising:

indicating a verification error when the second program unit implementation is not internally consistent;

indicating a verification error when said second program unit implementation is inconsistent with the second program unit API definition file; and

indicating a verification error when said second program unit implementation is inconsistent with said first program unit API definition file.

40. (New) A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for program verification, the method comprising:

providing a program in memory, the program comprising at least one program unit, each program unit comprising an Application Programming Interface (API) definition file and an implementation, each API definition file defining items in its associated program unit that are made accessible to one or more other program units, each implementation comprising executable code corresponding to said API definition file, said executable code comprising type specific instructions and data; and

performing a first verification prior to execution of said program, comprising:

indicating a verification error when a program unit implementation is not internally consistent;

indicating a verification error when a program unit implementation is inconsistent with its API definition file; and

indicating a verification error when a program unit implementation is inconsistent with the API definition file of a program unit referenced by said program unit.

41. (New) The program storage device of claim 40, said method further comprising performing a second verification comprising verifying said program after at least one program unit has been verified at least once, said second verification comprising:

indicating a verification error when a program unit implementation is not internally consistent;

indicating a verification error when a program unit implementation is inconsistent with its API definition file; and

indicating a verification error when a program unit implementation is inconsistent with the API definition file of each program unit referenced by said program unit.

42. (New) A system for executing a software application, the system comprising:

a computing system that generates executable code, comprising means for providing a program in memory, the program comprising at least one program unit, each program unit comprising an Application Programming Interface (API) definition file and an implementation, each API definition file defining items in its associated program unit that are made accessible to one or more other program units, each implementation comprising executable code corresponding to said API definition file, said executable code comprising type specific instructions and data; and

means for performing a first verification prior to an installation of said program, comprising:

means for indicating a verification error when a first program unit implementation is not internally consistent;

means for indicating a verification error when said first program unit implementation is inconsistent with a first program unit API definition file associated with said first program unit implementation.

43. (New) The computing system of claim 42, further comprising:

means for enabling execution of said program after said first verification if no verification error is indicated; and

means for preventing the execution of said program after said first verification if a verification error is indicated.

44. (New) The computing system of claim 43, further comprising:

means for performing a second verification comprising verifying a second program unit that references said first program unit and makes no items available for one or more other program units, said second verification comprising

means for indicating a verification error when the second program unit implementation is not internally consistent; and

means for indicating a verification error when said second program unit implementation is inconsistent with said first program unit API definition file.

45. (New) The computing system of claim 44 wherein:

said first program unit comprises at least one additional implementation; and

said means for performing a second verification comprises a means for determining whether said at least one additional implementation is consistent with said first program unit API definition file.

46. (New) The computing system of claim 43, further comprising means for performing a second verification comprising verifying a second program unit that references said first program unit, said means for performing said second verification comprising:

means for indicating a verification error when the second program unit implementation is not internally consistent;

means for indicating a verification error when said second program unit implementation is inconsistent with the second program unit API definition file; and

means for indicating a verification error when said second program unit implementation is inconsistent with said first program unit API definition file.

47. (New) A system for executing a software application, the system comprising:

a computing system that generates executable code, comprising means for providing a program in memory, the program comprising at least one program unit, each program unit comprising an Application Programming Interface (API) definition file and an implementation, each API definition file defining items in its associated program unit that are made accessible to one or more other program units, each implementation comprising executable code corresponding to said API definition file, said executable code comprising type specific instructions and data; and

means for performing a first verification prior to execution of said program, comprising:

means for indicating a verification error when a program unit implementation is not internally consistent;

means for indicating a verification error when a program unit implementation is inconsistent with its API definition file; and

means for indicating a verification error when a program unit implementation is inconsistent with the API definition file of each program unit referenced by said program unit.

48. (New) The system of claim 47, further comprising means for performing a second verification comprising verifying said program after at least one program unit has been verified at least once, said means for performing said second verification comprising:

means for indicating a verification error when a program unit implementation is not internally consistent;

means for indicating a verification error when a program unit implementation is inconsistent with its API definition file; and

means for indicating a verification error when a program unit implementation is inconsistent with the API definition file of each program unit referenced by said program unit.

49. (New) A resource-constrained device, comprising:

memory for providing a remotely verified application software program comprising at least one program unit, each program unit comprising an implementation comprising type specific instructions and data, said remote verification utilizing an Application Programming Interface (API) definition file for each said implementation, each said API definition file defining items in its associated program unit that are made accessible to one or more other program units, said remote verification comprising indicating a verification error when a first program unit implementation is not internally consistent and indicating a verification error when said first program unit implementation is inconsistent with a first program unit API definition file associated with said first program unit implementation; and

a virtual machine that is capable of executing instructions of said application software program.

50. (New) The resource-constrained device of claim 49 wherein said resource-constrained device comprises a smart card.

51. (New) The resource-constrained device of claim 50 wherein said virtual machine is Java Card™-compliant.

52. (New) A resource-constrained device, comprising

memory for providing a remotely verified application software program comprising at least one program unit, each program unit comprising an implementation comprising type specific instructions and data, said remote verification utilizing an Application Programming Interface (API) definition file for each said implementation, each said API definition file defining items in its associated program unit that are made accessible to one or more other program units, said remote verification comprising indicating a verification error when a first program unit implementation is not internally consistent, indicating a verification error when said first program unit implementation is inconsistent with a first program unit API definition file associated with said first program unit implementation and indicating a verification error when said first program unit is inconsistent with the API definition file of each program unit referenced by said first program unit; and

a virtual machine that is capable of executing instructions of said application software program.

53. (New) The resource-constrained device of claim 52 wherein said resource-constrained device comprises a smart card.

54. (New) The resource-constrained device of claim 53 wherein said virtual machine is Java Card™-compliant.